## 2. ORDER CETACEA - Whales, Dolphins, and Porpoises

# CETACEA

The 78 living species currently recognized in the Order Cetacea are divided into 2 suborders - Odontoceti (toothed whales) and Mysticeti (baleen whales). All representatives of a third suborder, Archaeoceti (ancient whales). are extinct. It is generally agreed that cetaceans are the most derived of all mammals (with the possible exception of bats). Evolved from terrestrial ancestors, they have totally adapted to living in the water, and have no need to come ashore, even for resting or reproduction.

All cetaceans share a similar general body plan: a streamlined (albeit some more-so than others) spindle-shaped torso; flattened paddle-like foreflippers; telescoped skull; nasal openings on top (rather than on the front) of the head; a well-developed blubber layer; internal reproductive organs; newly derived boneless structures in the form of tail flukes and a dorsal fin or ridge (not present in some species); and the loss of such aquatic hindrances as hind limbs (present, if at all, as vestiges), external ear flaps, and fur (although all have hair at some time during their early development and some retain a few rostral hairs for life). Although they may somewhat resemble fish externally, the cetaceans' internal anatomy betrays their terrestrial mammalian ancestry. Their flippers contain reduced counterparts of all or most of the hand and arm bones characteristic of other mammals; pelvic rudiments (and occasionally hind limb remnants) are present. The internal anatomy of cetaceans is surprisingly like that of more familiar land mammals, with such interesting exceptions as the presence of a 3-chambered stomach and cartilaginous reinforcements of the airways all the way down to the alveoli.

### 2.1 Key to Identification of Cetaceans of the World

**1a.** Double blowhole; no teeth present; baleen plates suspended from upper jaw (Fig. 12) . . . . . **(Baleen whale)** → 2

**1b.** Single blowhole; teeth present (though sometimes not protruding from gums); no baleen plates (Fig. 13) . . . . . **(Toothed whale)** → 12

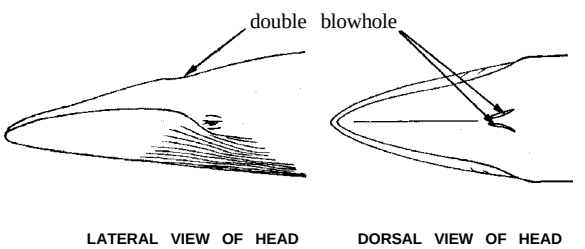



Fig. 12 Baleen whale

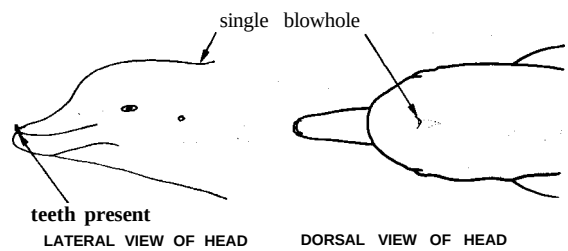



Fig. 13 Toothed whale

**2a.** Long ventral pleats absent (though 2 to 5 short creases or furrows may be found on throat); dorsal fin present or absent; upper jaw relatively arched viewed from the side (Fig.14). . . . . → 3

**2b.** Long ventral pleats present; dorsal fin present; upper jaw relatively flat viewed from the side and broad viewed from the top (Fig. 15) . . . . . **(Rorqual)** → 5

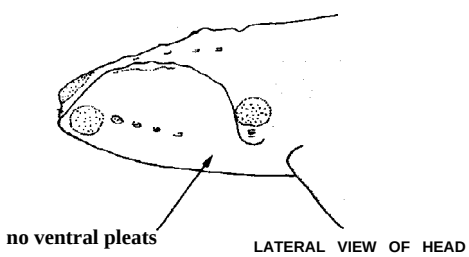



Fig. 14

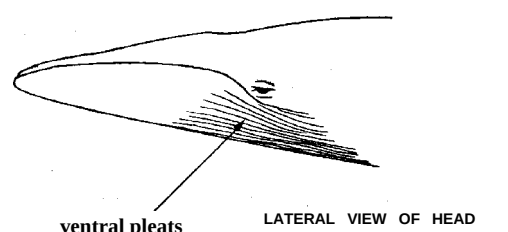



Fig. 15 Rorqual

**3a.** Short creases or furrows on throat 2 to 5; dorsal fin or hump present; upper jaw and mouthline flat to slightly arched; baleen plates short (Fig. 16) . . . . . → 4

**3b.** No creases on chin or throat; no dorsal fin or hump; upper jaw and mouthline strongly arched viewed from the side and very narrow viewed from the top; long, narrow black baleen plates with fine black fringes (Fig. 17) . . . . . **(Right whale or bowhead whale) → 10**

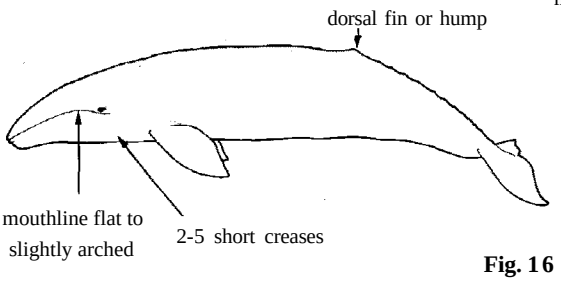



**Fig. 16**

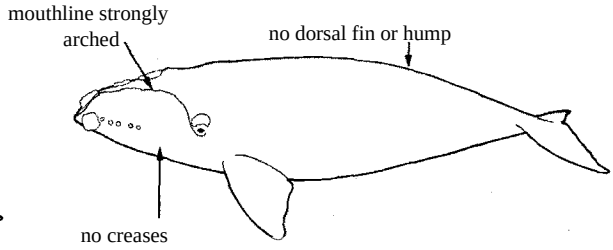



**Fig. 17 Right whale or bowhead whale**

**4a**. Indistinct creases on throat 2; prominent falcate dorsal fin set about two-thirds of the way back from tip of jaw; upper jaw arched when viewed from side; 210 to 230 yellowish white baleen plates in each side; maximum body length 7 m; Southern Hemisphere distribution only (Fig. 18) . . . . . **Pygmy right whale *(Caperea marginata)* p. 48**

**4b.** Short furrows on throat 2 to 5; no dorsal fin, but small dorsal hump followed by 6 to 12 crenulations present; mouthline slightly arched; 139 to 180 white to yellowish baleen plates with coarse bristles per side; body mottled grey and usually covered with patches of reddish to yellowish whale lice and grey to white barnacles; maximum body length 15 m; North Pacific distribution only (Fig. 19). . . . . **Gray whale *(Eschrichtius robustus)* p. 62**

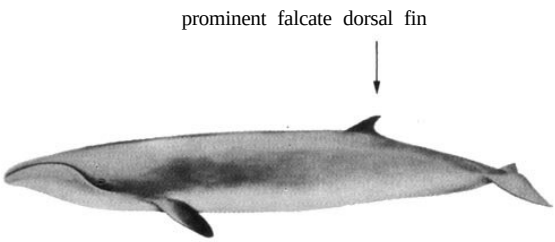



**Fig. 18 *Caperea marginata***

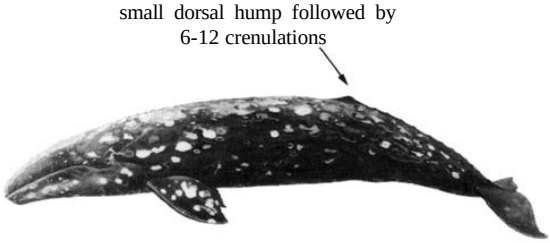



**Fig. 19 *Eschrichtius robustus***

**5a.** Ventral pleats end before navel (Fig. 20). . . . . → **6**

**5b.** Ventral pleats extend to or beyond navel (Fig. 21) . . . . . → **7**

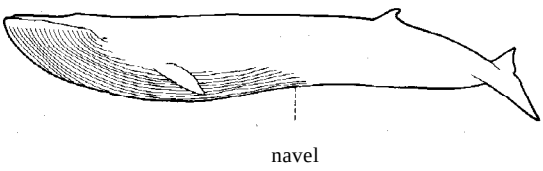



**Fig. 20**

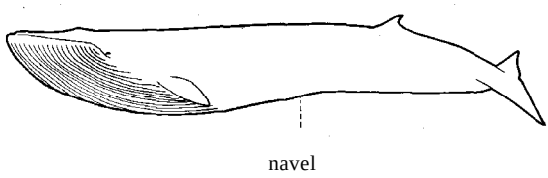



**Fig. 21**

**6a**. Ventral pleats 30 to 70, longest ending before navel (often ending between flippers); 231 to 360 baleen plates with coarse bristles per side, less than 21 cm long, mostly white or yellowish white (sometimes with dark margin along outer edge); often conspicuous white bands on upper surface of flippers; from above, head sharply pointed; maximum body length 9 m (Fig. 22). . . . . **Minke Whale *(Baluenoptera acutorostrata)*** **p. 58**

**6b.** Ventral pleats 32 to 60, longest ending past flippers, but well short of navel; 219 to 402 pairs of black baleen plates with many fine whitish bristles, less than 80 cm long; flippers all dark; from side, snout slightly downturned at tip; maximum body length 16 m (Fig. 23) . . . . . **Sei Whale *(Baluenoptera borealis)*** **p. 54**

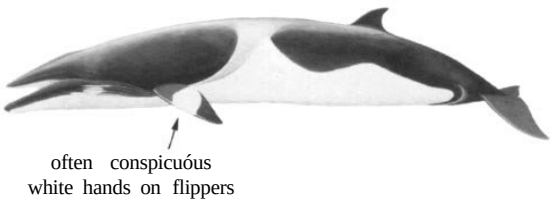



**Fig. 22 *Balaenoptera acutorostrata***

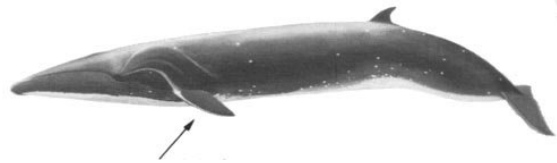



**Fig. 23 *Balaenoptera borealis***

**7a**. Flippers one-fourth to one-third of body length, with knobs on leading edge; flukes with irregular trailing edge; less than 35 broad conspicuous ventral pleats, longest extending at least to navel; top of head covered with knobs, 1 prominent cluster of knobs at tip of lower jaw; 270 to 400 black to olive brown baleen plates with grey bristles per side, less than 80 cm long; dorsal fin usually atop a hump; maximum body length 16 m (Fig. 24) . . . . . **Humpback whale *(Megaptera novaeungliae)*** **p. 60**

**7b.** Flippers less than one-fifth of body length, lacking knobs; flukes with smooth trailing edge; 40 to 100 fine ventral pleats; head lacking knobs; dorsal fin not atop a hump (Fig. 25) . . . . → **8**

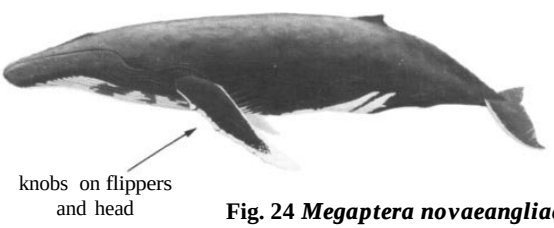



**Fig. 24 *Megaptera novaeangliae***

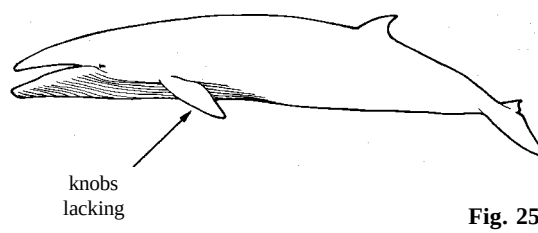



**Fig. 25**

**8a**. Three conspicuous ridges on snout; 40 to 70 ventral pleats extending to umbilicus; 250 to 370 slate-grey baleen plates per side, with white to light grey fringes; head coloration symmetrical; maximum body length 16 m; tropical and subtropical distribution only (Figs 26 and 27) . . . . . **Bryde'swhale *(Balaenoptera edeni)*** **p. 56**

**8b.** Only 1 prominent ridge on snout; 55 to 100 ventral pleats (Fig. 27) . . . . . → **9**

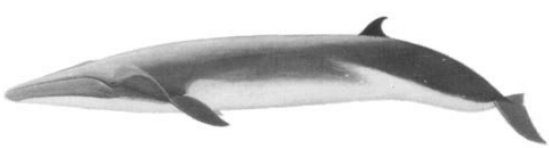
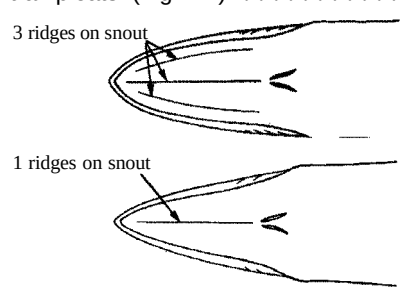


**Fig. 26 *Balaenoptera edeni***




**DORSAL VIEW OF HEADS**

**Fig. 27**

**9a.** Head broad and almost U-shaped from above; dorsal fin very small (about 1% of body length) and set far back on body; 270 to 395 black baleen plates with black bristles per side (all 3 sides of each plate roughly equal in length); head coloration symmetrical; body mottled grey, with white under flippers; maximum body length 33 m (Fig. 28) . . . . . **Blue whale *(Balaenoptera musculus)*** **p. 50**

**9b**. From above, head V-shaped and pointed at tip; dorsal fin about 2.5% of body length; 260 to 480 grey baleen plates with white streaks per side (front one-third of baleen on right side all white); head coloration asymmetrical (left side grey, much of right side white); back dark, with light streaks; belly white; maximum body length 24 m (Fig. 29) . . . . . **Fin whale *(Balaenoptera physalus)*** **p. 52**

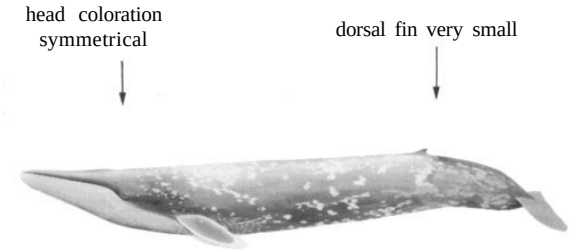



**Fig. 28 *Balaenoptera musculus***

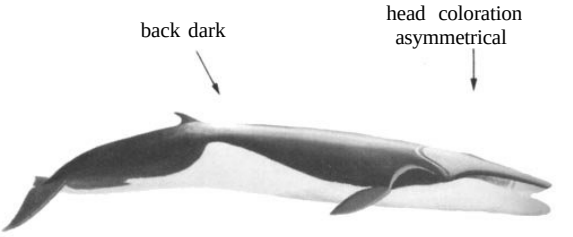



**Fig. 29 *Balaenoptera physalus***

**10b**. No callosities; white chin patch and often white band just before flukes; 250 to 350 long (some longer than 4 m) baleen plates per side; maximum body length 20 m; Arctic distribution only (Fig. 30) . . . . . **Bowhead whale *(Balaena mysticetus)*** **p. 46**

**10a.** Callosities (roughened areas of skin to which whale lice attach) present on head; 200 to 270 long (up to 2.8 m) baleen plates per side; body black, often with white ventral blotches; maximum body length 17 m; temperate to subarctic distribution (Fig. 31) . . . . . **(Right whale) → 11**

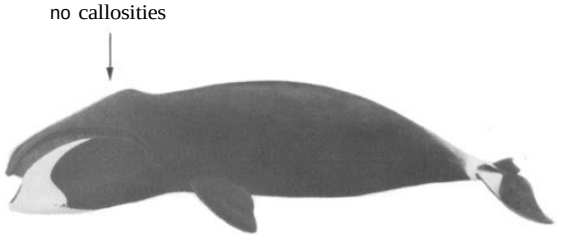



**Fig. 30 *Balaena mysticetus***

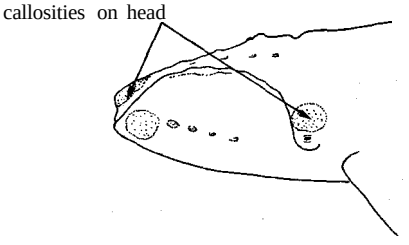



**Fig. 31 Right whale**

**11a.** Northern Hemisphere distribution (Fig. 32) . . **Northern right whale *(Eubalaena glacialis)*** **p. 42**

**11b.** Southern Hemisphere distribution (Fig. 33) . . **Southern right whale *(Eubalaena australis)*** **p. 44**

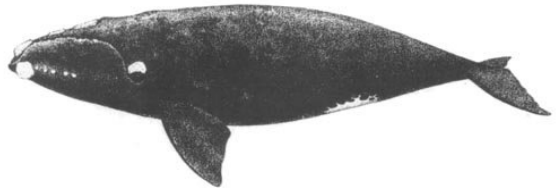


**Fig. 32 *Eubalaena glacialis***

**Fig. 33 *Eubalaena australis***

**12a.** Upper jaw extending well past lower jaw; lower jaw very narrow (Fig. 34) . . **(Sperm whale) → 13**

**12b**. Upper jaw not extending much or at all past lower jaw; lower and upper jaws about same width(Fig.35). . . . . **→ 15**

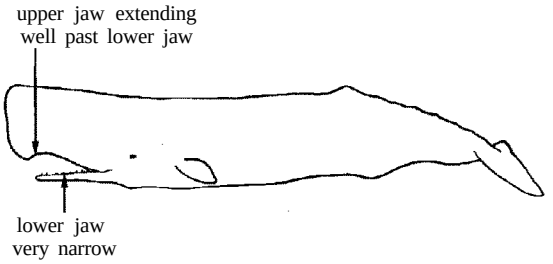



**Fig. 34 Sperm whale**

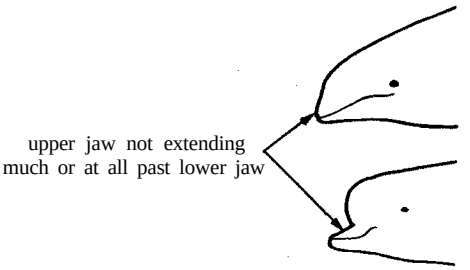



**Fig. 35**

**13a.** Body black to charcoal-grey, with white lips and inside of mouth; head squarish and large, 20 to 30% of body length; short creases on throat; S-shaped blowhole at left side of front of head; low, rounded dorsal "hump" followed by a series of crenulations along the midline; 18 to 25 heavy, peg-like teeth in each side of lower jaw, fitting into sockets in upper jaw; body 4 to 18m (Fig.36) . . . . . **Sperm whale *(Physeter catodon)* p. 68**

**13b**. Head not more than 15% of body length; blowhole set back from front of head: prominent dorsal fin; 8 to 16 long, thin, sharply pointed teeth in each side of lower jaw, fitting into upper jaw sockets; body less than 4 m (Fig. 37) . . . . . **(*Kogia* sp.- 2 species generally difficult for non-experts to distinguish) → 14**

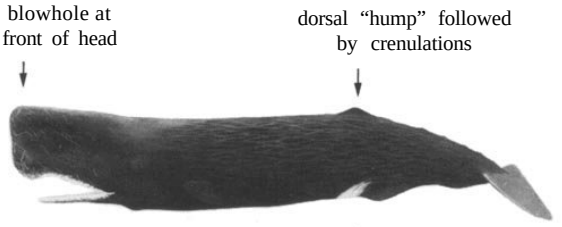



**Fig. 36 *Physeter catodon***

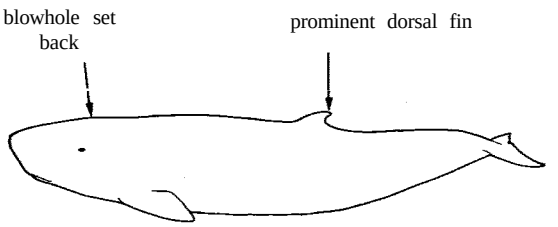



**Fig. 37 *Kogia* sp.**

**14a.** Throat creases generally absent; dorsal fin short (< 5% of body length); distance from tip of snout to blowhole greater than 10.3% of total length; 12 to 16 (rarely 10 to 11) sharp teeth in each half of lower jaw; maximum body length 3.4 m (Fig. 38) . . . . . **Pygmy sperm whale *(Kogia breviceps)* p. 70**

**14b**. Inconspicuous throat creases: dorsal fin tall (> 5% of body length); distance from tip of snout to blowhole less than 10.2% of total length; 8 to 11 (rarely up to 13) teeth in each side of lower jaw, sometimes 1 to 3 in each half of upper jaw; maximum body length 2.7 m (Fig. 39) . . . . . **Dwarf sperm whale *(Kogia simus)* p. 72**

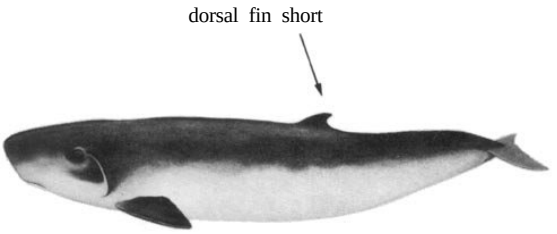



**Fig. 38 *Kogia breviceps***

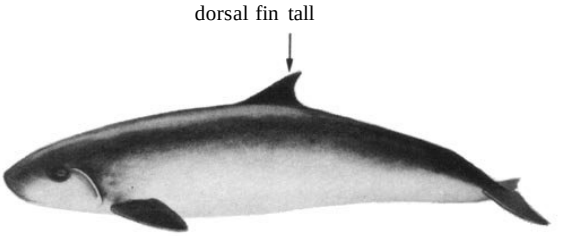



**Fig. 39 *Kogia simus***

**15a.** Two conspkuous creases on throat, forrning a fotward-pointing V; notch between flukes usually absent or indistinct; dorsal fin relatively short and set far back (Fig. 40) **(Beaked whale) → 16**

**15b.** No conspicuous creases on throat; prominent median notch in flukes; dorsal fin usually tall and in middle of back (Fig. 41) . . . . . **(Dolphin, porpoise, or monodontid) → 25**

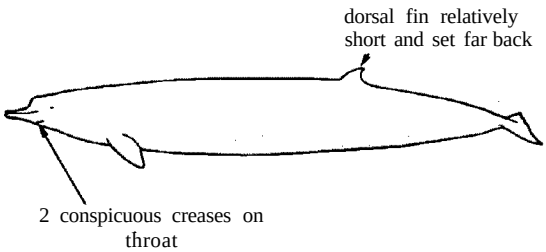



**Fig. 40 Beaked whale**

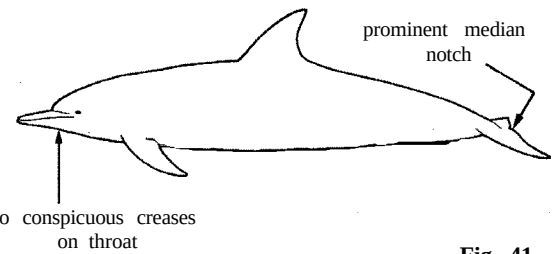



**Fig. 41**

**16a.** Exposed teeth in both upper and lower jaws (may be inconspicuous or missing in some Gray's beaked whales) . . . . . **→ 17**

**16b.** Lower jaw only with 1 to 2 pairs of teeth (even these not erupted in many individuals) . . . **→ 18**

**17a.** Many teeth in both jaws (17 to 28 per tooth row); pair of tusks at tip of lower jaw that erupt only in males; maximum body length 7 m; Southern Hemisphere distribution only (Fig. 42) . . . . . **Shepherd's beaked whale *(Tasmacetus shepherdi)* p. 88**

**17b**. Small head; extremely long, narrow beak; white lower jaw and dark grey upper jaw; 2 small triangular teeth well behind tip of lower jaw in males; 17 to 22 pairs of vestigial teeth in upper jaw of both sexes (Fig. 43) . . . . . **Gray's beaked whale *(Mesoplodon grayi)* p. 92**

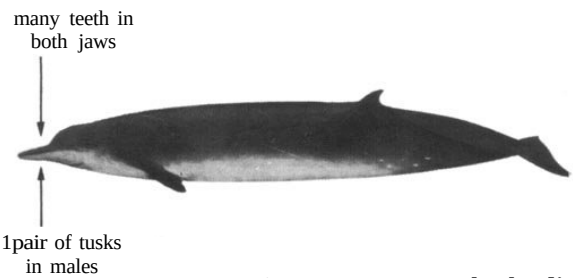



**Fig. 42 Tasmacetus *shepherdi***

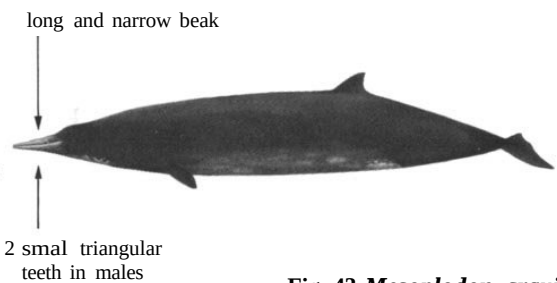



**Fig. 43 *Mesoplodon grayi***

**18a.** One or 2 pairs of teeth at or near tip of lower jaw, erupted only in some adults; head either with indistinct beak, or with distinct beak and steep forehead (Fig. 44) . . . . . **→ 19**

**18b.** Usually 1 pair of teeth well behind tip of lower jaw, erupted only in adult males; small head; prominent beak with forehead rising at shallow angle; sometimes flippers fit into depressions on the body; scratches and scars common on body; maximum body length 6.2 m (Fig. 45) . . . . . ***(Mesoplodon* sp.) p. 90 → 24**

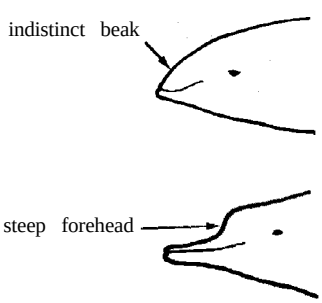



Fig. 44

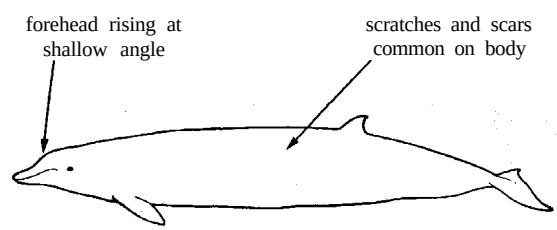



**Fig. 45 *Mesoplodon sp.***

**19a.** Two pairs of teeth in lower jaw, 1 pair at tip exposed outside closed mouth, second smaller pair behind first; long tube-like beak; rounded forehead rises from snout at a steep angle) . . . . . .(***Berardius* sp.)** → **20**

**19b.** One pair of teeth at tip of lower jaw (exposed only in adult males); short or indistinct beak . . . → **21**

**20a.** Maximum body length 13 m; Northern Hemisphere distribution only (Fig. 46) . . . . . **Baird's beaked whale *(Berardius bairdii)* p. 78**

**20b.** Maximum body length 11 m; Southern Hemisphere distribution only (Fig. 47) . . . . . **Arnoux's beaked whale *(Berardius arnuxii)* p. 80**

**Fig. 46 *Berardius bnirdii***

**Fig. 47 *Berardius arnuxii***

**21a.** Beak indistinct; head small relative to body size; forehead slightly concave in front of blowhole; single pair of teeth directed forward and upward at tip of lower jaw (exposed only in adult males); mouthline upturned at gape; head light coloured; maximum body length 7.5 m (Fig. 48) . . . . . **Cuvier's beaked whale *(Ziphius cavirostris)* p. 82**

**21b.** Tube-like beak distinct; pronounced bulge to steep forehead; tall, pointed dorsal fin; maximum length 10 m (Fig. 49). . . . . **(Bottlenose whale)** → **22**


**Fig. 48 *Ziphius cavirostris***

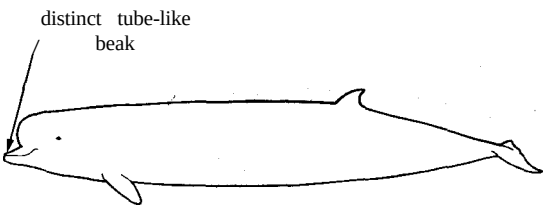



**Fig. 49 Bottlenose whale**

**22a.** Southern Hemisphere distribution only (Fig. 50) . . . . . **Southern bottlenose whale *(Hyperoodon planifrons)* p. 86**

**22b.** Northern Hemisphere distribution. . . . . **23**

**Fig. 50 *Hyperoodon planifrons***

**23a.** Cold temperate to subpolar; north Atlantic distribution only (Fig. 51) . . . . . **Northern bottlenose whale *(Hyperoodon ampullutus)*** **p. 84**

**23b.** Warm temperate to tropical North Pacific, Indian, and Atlantic otean distribution . . . . . ***Hyperoodon*** **sp. (unidentified)** **p. 87**

**Fig. 51** ***Hyperoodon ampullatus***

**24.** The species of the genus ***Mesoplodon*** are generally poorly known. External morphology and pigmentation patterns have not been properly described for most of them, and it is generally not possible for non-experts to identify whales of this genus to species. Even for experts, examination of skulls may be required to identify all but mature males.

**24a.** Moderate beak, not sharply demarcated from forehead; males with white "cap" or "beanie" in front of blowhole; adult males with large flattened tusk in the middle of each side of lower jaw, protruding above upper jaw when mouth is closed; known from North Pacific only (females and subadults require museum preparation for identification) . . . . . **Hubbs' beaked whale *(Mesoplodon carlhubbsi)*** **p. 98**

**24b.** Uniformly dark beak; in adult males, tusks near middle of lower jaw barely breaking gumline; known from the Pacific and Indian oceans only (females and subadults require museum preparation for identification) . . **Ginkgo-toothed beaked whale *(Mesoplodon ginkgodens)*** **p. 94**

**24c.** White markings on beak and forehead absent; lower jaw usually light in colour; tusks of males very large, located on bony prominentes near corners of mouth, and oriented slightly forward; lower jaw massive (particularly in adult males), with high arching contour; forehead has concavity in front of blowhole (females and subadults require museum preparation for identification) . . . . . **Blainville's beaked whale *(Mesoplodon densirostris)*** **p. 90**

**24d.** Flattened tusks of adult males' near tip of lower jaw (females and subadults require museum preparation for identification) . . **Hector's beaked whale *(Mesoplodon hectori)*** **p. 96**

**24e.** Small (maximum length about 4 m); dorsal fin small, triangular, and rounded at tip; colour dark grey above, fading to lighter below; small egg-shaped teeth located on prominences near the middle of the lower jaw in adult males; known only from eastern Pacific (females and subadults require museum preparation for identification) . . . . . **Pygmy beaked whale *(Mesoplodon peruvianus)*** **p. 100**

**24f.** External appearance unknown; 2 teeth at tip of lower jaw of males point forward and are oval in cross-section (specimens require museum preparation for identification) . . . . . **Longman's beaked whale *(Mesoplodon pacificus)*** **p. 112**

**24g.** Pair of small oval teeth at tip of lowerjaw of adult males; body grey with dark areas around eyes (females and subadults require museum preparation for identification) . . . . . **True's beaked whale *(Mesoplodon mirus)*** **p. 106**

**24h.** Two small flattened teeth near front of lower jaw of males; body dark grey above, light grey below; known only from Atlantic Ocean (females and subadults require museum preparation for identification) . . . . . **Gervais' beaked whale *(Mesoplodon europaeus)*** **p. 104**